International Council
for Research and Innovation
in Building and Construction

**April 2020**

## Special Issue Call for Papers

# Smart and Sustainable Built Environment


### Integration of IoT with Building Information Modelling (IoT-BIM)

**Overview of special issue**

The Fourth Industrial Revolution (otherwise known as Industry 4.0 or simply I4) continues unabated as it progressively shapes modern economies by developing transformative 'smart' digital solutions in response to societal needs. I4 embraces a coalescence of inextricably linked cyber-physical systems that fully monitor, control and automate the design, construction and facility management phases of a project's whole life-cycle. These systems may embrace aspects relating to: FinTech, mobile communications, internet of things (IoT), data science, cyber security, cloud computing, artificial intelligence/intelligent systems, mechatronics, e-business, digital marketing and digital twin. Early innovator contractors who successfully integrate and embed a synthesis of advanced technologies within their business operations will invariably secure a significant competitive advantage over their market rivals. Yet despite the opportunity to forge a market lead, I4 adoption remains inchoate and lacking the necessary industry leadership to drive disruptive innovations forward towards full adoption. Convincing case studies and de facto evidence are now needed within academia and practice in order to firmly establish the market potential and further augment wider spread adoption.

During the last five years, BIM has received unprecedented academic attention in scientific journals, not only within traditional engineering and construction management but also other related disciplines like business management, computational intelligence, computer science and operations management. At first, academic attention predominantly focused upon developing applied solutions to practical problems but more recently, ever finer granulation of the subject area has witnessed an upsurge in 'softer' management theory and education type research activities – such ossification of conventional BIM research work has stagnated a formerly vibrant and novel topic area.. Moreover, akin to computer aided design (CAD), BIM has a predisposed shelf-life unless it evolves dynamically by integrating with other emergent advanced technologies within the wider I4 discipline. This SI will therefore breathe much needed technological modernity into contemporary BIM research, whilst simultaneously forging stronger linkages with the wider I4 initiative. Extending BIM capabilities will provide new opportunities for internationally leading researchers to showcase their inimitable ability to extend knowledge beyond current constraints of contemporary BIM thinking. In doing so, this SI will provoke broader polemic debate and raise awareness of the potential to achieve IoT-BIM.

This proposed pioneering Special Issue (SI) will focus upon one aspect of I4, namely IoT and

building information modelling (BIM) integration (IoT-BIM). Consequently, it will provide the first global platform by which construction and civil engineering researchers can contribute to the ensuing discourse on this unique phenomenon. Specifically, the SI will provide researchers with an opportunity to: showcase emergent findings of their research on 'use cases' of IoT-BIM; explore emerging methodologies for achieving IoT-BIM; and determine how IoT-BIM can benefit construction practitioners and the wider socio-political landscape. Papers will be particularly encouraged that: provide real-life case studies of IoT-BIM; report upon how IoT-BIM implementation disrupts and transforms current construction operations; and report upon managerial and strategic dimensions of IoT-BIM adoption (such as changes needed at the project, organisation and industry levels as well as the impacts upon supply chain partners).

**Aims of special issue**

There are three specific aims of this SI. The first is to rejuvenate the BIM research life-cycle as it advances through various states of vicissitude before entering new phases of metamorphosis that create fresh innovative research endeavours and concomitant knowledge advancements. The second aim is to document and impart the palpable benefits of IoT-BIM through publication of real-life case studies, practice notes, comparative studies and deterministic modelling accrued from applied research undertaken. The products of this will inform professional practitioners by clearly defining and delineating compelling factual evidence that will ultimately: i) shape the future direction of industry practice; and ii) ensure a smoother transition of adoption. The third aim is to educate and develop future generations of further and higher education practitioners who represent the vanguard of professional talent who seek a career within the construction and civil engineering sector. Hence, this SI is deliberately designed to achieve high impact in terms of shaping future research endeavours, informing industry practitioners and enhancing the content of the next generation of taught curricular.

**Themes**

- Real-world case studies;
- Conceptual research that uncovers the barriers, drivers and concepts associated with adopting and implementing IoT-BIM within an organisation;
- Operational research that adopts IoT as a tool to support resource management and decision making with BIM;
- Operational research that demonstrates the productivity and efficiency gains accrued from adopting IoT-BIM within the construction supply chain;
- Computer science research that seeks to explore and resolve data interoperability and governance conundrums;
- Environmental management research that seeks to mitigate the environmental impacts of smart construction development activities;
- Government policy research that develops standards, models and platforms for shaping future policy provisions;
- Business research that provides template business models for adoption and/or prima facie evidence of financial benefits to be accrued;
- Validation research that assesses the readiness and maturity state of construction organizations for adopting IoT-BIM;
- Supply chain management research that demonstrates palpable benefits of collaborative working on virtual information portals;
- Exploratory research that seeks to undercover new roles, and knowledge, skills and abilities (KSAs) required for implementation and adoption.

**Guest Editors**

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**Submission details**
The closing date **31st October 2020**

**Information**

For full author guidelines and instructions on how to submit can be found here.

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